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THE

# INCREASE OF HUMAN LIFE.

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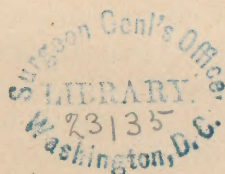
READ BEFORE THE  
AMERICAN STATISTICAL ASSOCIATION.

By EDWARD JARVIS, M.D.  
President of the Association.

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Reprinted from the "Atlantic Monthly," for the  
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1872

EXPERIENCE OF HUMAN LIFE

JOHN RUSKIN

THE UNIVERSITY OF CHICAGO

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JOHN RUSKIN

## THE INCREASE OF HUMAN LIFE.

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### PART I.

THE halcyon days are in the past, and these are the days of degeneracy.

We hear these complaints, now and then, from persons whose eyes and ears are open to the evil and the suffering present to and around them, which they see and hear and feel, while they remember, or read of, or learn by tradition, only or mainly the virtues that were manifested, the good works that were accomplished, and the blessings that were enjoyed by their fathers. These are sad times, the world is going backward, they say; and then they hang their heads in despair of the future.

The same was said last year and in the last century. Looking through the records of many hundred years past, we find, in every age, the same complaints, the same sorrowful discontent with the present, the same hopeless distrust of the future, and the same respect for the past.

Prominent among these complaints is the one that human life is waning, that a larger proportion die in childhood and youth, and that of those who survive their twentieth year a smaller proportion are permitted to enjoy the full period of labor and usefulness, and die in a good old age.

All this is without foundation. The sanitary history of the world shows that the reverse of this opinion is true, that life has been increasing both in power and in duration, and that it is now increasing more than ever before. As mankind has emerged from the rude conditions of barbarism, and made progress in

civilization, there has been an almost constant improvement in life. As man has added to his means of subsistence and of protection, and to his comforts, in house and clothing, he has strengthened himself against destructive influences, saved himself from, or carried himself through, the assaults of disease, and added to the number of his years on earth.

### *Early Records.*

In the earlier periods of the world, no records were kept of disease and death, of life and its duration. Such records were few and far between, in all ages until the present century. Even those that were made were not universal among any people. They were confined to special classes, and often made only for special purposes.

The records of the earlier ages were loosely made, and are probably sometimes mixtures of fact and fable, including what the writers thought, as well as what they knew, to be true. Moreau de Jonnès, the French writer on population, in his work on the Populations of Antiquity, says: "The ancients were very prone to exaggerate numbers." This French statistician finds much sympathy among those who wish to compare ancient with modern representations of similar facts in similar circumstances, or to estimate the value of old records in connection with the conditions attached to, and with the circumstances that surrounded, the things they describe.

None of the nations of antiquity and none in the Middle Ages took account and made general and public record of the three great events of man—his birth, marriage, and death. It is only within four hundred years that in any nation, state or town, such reliable records have been kept by public authority as will show the longevity of the people; and although, in most civilized countries, these facts are now recorded with various degrees of fulness and accuracy, yet few of the records reach back into the last century; most of them have been begun, or have been made reliable, within less than fifty years.

### *Ancient Roman Life.*

The oldest account of the mathematical value of human life



is that of Ulpianus — a Roman judge in the time of the Emperor Alexander Severus — extending from two hundred and twenty-two to two hundred and thirty-five years after the Christian era. For the purpose of determining the value of life-estates, reversions, &c., he made inquiry as extensively as he could, and enlisted others to aid him as far as possible, and from their observations and researches into the personal history of many who had passed away, he calculated the average number of years that they had lived from birth, from their twentieth, twenty-fifth, thirtieth years, and other quinquennial epochs, and came to the reasonable conclusion that others, then and thereafter living, would enjoy, on an average, the same longevity, from birth and from the several other periods of life.

These calculations of Ulpianus, as to the value of life at birth and at the several after-ages, were adopted by the Roman courts as their rule in determining the worth of life-rights, reversions, &c. They seem to have been held in undisputed authority for the guidance of the judicial tribunals in these matters; and in the year 533, three hundred years after Ulpianus had made them, they were incorporated into and made a part of the Pandects of Justinian, by the learned commission which the emperor had appointed to revise and codify the Roman law.<sup>1</sup> During this period, and afterward while the Empire continued, these principles continued to be received by the courts and people as the true representation of the longevity of the richer, more cultivated, and favored classes among whom the original observations were made.

### *Mediæval Records of Mortality.*

The oldest trustworthy and comprehensive record of modern times is that which has been kept in the canton and city of Geneva, in Switzerland, for near four hundred years. The Genevans carefully recorded the ages of the deceased, and the number of births, and prepared and left a means of determining the value of life, and of showing its advancement through the last four centuries.

Many of the English towns and parishes took account of the

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<sup>1</sup> Justiniani Pandectæ, Lib. 35 Tit. 2 Ad Legem Falcidiam.

baptisms and burials; and at times, in some places, the causes of death were stated, from the middle of the sixteenth century. Similar records were made and have come down to us, covering the same period, in many towns of Germany and Holland, and in some of France.

About two hundred years ago John Graunt, an Englishman, wrote a book entitled, "Philosophical Observations on Bills of Mortality." A hundred years later Dr. Thomas Short published a work on the "Increase and Decrease of Mankind." Corbyn Morris made another valuable contribution to the history of life and mortality in the sixteenth, seventeenth, and eighteenth centuries, by his history of the "Present and Past Growth of London."

These valuable and laborious writers seem to have been most diligent and painstaking in their researches into every sort of record that referred to death and its causes. They examined the town, city, parish, and church records of baptisms and burials, and in their books we find most important tables and statements of the numbers of baptisms and of burials in many towns and cities in England, and in some on the continent. Morris gives several tables, showing the numbers that perished from each fatal disease in London, in periods of years, from 1575 to 1757.

One of the most valuable sanitary histories of the world is the first volume of Part V. of the census of Ireland for 1851, a folio of five hundred and sixty pages. The author of this work went back in his researches, through history, record, and tradition, to ages before the Christian era, and, as far as his means allowed, showed the prevalent diseases and general mortality in Ireland, England, and some other countries of Europe, during more than two thousand years.

#### *Mortality in Former and Present Times.*

All these and other records of early times show the great prevalence and severity of many diseases — and especially those of childhood — that are now comparatively infrequent and harmless.

Cities were more unhealthy and destructive than they are now.



The records of these places were made more fully and have been better preserved than those of the country districts. They show that some of the dense towns could not sustain their own population from generation to generation. Their deaths were more than their births, and they were indebted to immigration from the country for the continuance as well as the increase of their inhabitants.

In London, in the seventy-eight years from 1604 to 1682—including the several ravages of the plague—the births were six hundred and ninety-nine thousand six hundred and seventy-five, and the burials nine hundred and sixty-four thousand eight hundred and eighty-two.<sup>1</sup>

In the ten years, 1851 to 1860, there were, in London, eight hundred and sixty-four thousand two hundred and sixty-three births,<sup>2</sup> and six hundred and ten thousand four hundred and seventy-three deaths.<sup>3</sup> In the former period, for every hundred births there were one hundred and thirty-seven burials; and in the latter period, for every hundred births there were seventy-eight burials.

Not including the mortality from the plague, two hundred years ago, the deaths were one in twenty of the living, and including those from the plague, the annual mortality was one in twelve and a half of the living. Now the rate of death is only one in forty-two and thirty-one hundredths.<sup>4</sup>

In Dresden, 1617 to 1700, there were forty-six thousand four hundred and twenty-three births, and sixty-six thousand four hundred and sixty deaths.<sup>5</sup>

In Augsburg, through two hundred years—1500 to 1700—the births were two hundred and eighty-five thousand four hundred and twelve, and the deaths three hundred and twenty-six thousand one hundred and ninety.<sup>5</sup>

In Breslau, the births were one hundred and eight thousand nine hundred and nineteen, and deaths one hundred and twenty-five thousand six hundred and eighty-five, in the period from 1633 to 1734.<sup>5</sup>

<sup>1</sup> Graunt, Bills of Mortality, p. 43.

<sup>2</sup> Registrar-General's 15th to 24th Reports.

<sup>3</sup> Supplement to Registrar-General's 25th Report, pp. 4, 5.

<sup>4</sup> Calculated from Short's and Registrar-General's Reports.

<sup>5</sup> Short, Increase and Decrease of Mankind, pp. 155, 161.



In Paris, from 1728 to 1737, one hundred and sixty-eight thousand one hundred and ninety-nine were born, and one hundred and eighty-two thousand four hundred and eighty-one died.<sup>1</sup> In the five years, 1861 to 1866 inclusive, the births were three hundred and nine thousand one hundred and eighty-eight, and deaths two hundred and sixty-one thousand nine hundred and thirty-nine.<sup>2</sup> For every hundred births, in each of these periods, there were one hundred and eight deaths in the former and eighty-four deaths in the latter. The improvements in food have greatly reduced the rate of mortality of the people of France. In 1781, the deaths were one in twenty-five, or 4 per cent.<sup>3</sup> In the five years 1861 to 1865, the rate was one in forty-three, or 2·32 per cent.<sup>4</sup>

The mortality in Denmark was one in thirty-two, in the years 1750 to 1754,<sup>5</sup> and one in thirty-six and a half in the eight years 1860 to 1867.<sup>6</sup>

In Prussia, for every hundred children born, in each period, there were sixty-six deaths from 1698 to 1702,<sup>7</sup> and sixty-two in the three years, 1861, 1862, and 1863.<sup>8</sup>

In Silesia, the rate of mortality was one in thirty-one of the living, in the years 1728 to 1735, and one in thirty-five in the three years, 1861 to 1863.<sup>9</sup>

Eighty-eight years ago, the mortality in Berlin was one in twenty-eight.<sup>9</sup> It is now one in thirty-seven and a half.<sup>9</sup>

In Sweden, the rate of mortality was, in the period from 1755 to 1776, one in thirty-four and two thirds,<sup>9</sup> and from 1855 to 1860 it was one in forty-two and nine tenths of the living population.<sup>10</sup>

The rate in Dublin was one in twenty-two in the beginning of the eighteenth century,<sup>11</sup> and one in thirty-eight in the middle of the nineteenth.<sup>12</sup>

<sup>1</sup> Short, Increase and Decrease of Mankind, pp. 155, 161.

<sup>2</sup> Statistique de la France, 1860. Vol. XI. pp. xxiv., xxxiv.

<sup>3</sup> Moreau de Jonnes. Peuples de l'Antiquité, p. 109.

<sup>4</sup> Statistique de la France, 2d Serie. Mouvement de la Population, 1851 to 1855.

<sup>5</sup> Quetelet, Sur L'Homme, 223.

<sup>6</sup> Sammen drag af Statistiske Oplysninger Angaaende Kong. Danmark, p. 6.

<sup>7</sup> Price, Reversionary Payments, II. p. 314.

<sup>8</sup> Preussische Statistik, 1866.

<sup>9</sup> Price, Observations in Cyclopædia Americana.

<sup>10</sup> Sveriges, Officielle Statistik, Bevolknings. Calculated.

<sup>11</sup> Price, Reversionary Payments, I. p. 256.

<sup>12</sup> Registrar-General's Reports, Ireland, 1864, 1865, and 1866.

*Decrease of Mortality.*

"It is well established, that in the country, where civilization is most advanced, there has been the greatest diminution of mortality."<sup>1</sup>

Mr. Griffith Davis, a learned actuary, and writer on vital statistics, in the London Assurance Magazine, says:—

"By laborious investigation, I have ascertained upon indubitable evidence that a gradual diminution of mortality has taken place among the inhabitants of this country (England and Wales) through the last hundred years, and, taking all ages together, out of the same population there were—

Period.	Annual Deaths.	Period.	Annual Deaths.
1720 to 1730	106	1780 to 1790	79
1730 to 1740	104	1790 to 1800	75
1740 to 1750	92	1800 to 1805	70
1750 to 1760	85	1805 to 1810	66
1760 to 1770	84	1810 to 1815	61
1770 to 1780	86	1815 to 1820	62

So that the mortality has decreased two fifths from 1720 to 1820.<sup>2</sup>

This is corroborated by the statement of Mr. Edmonds in the London Assurance Magazine,<sup>3</sup> in connection with the deductions from the Reports of the Registrar-General, which show that the average rate of mortality in England and Wales was, in the first forty years of the eighteenth century, three hundred and forty in ten thousand living, and in the last forty years, 1821 to 1860, it was two hundred and seven in the same population.

Nearer home we find similar evidence of diminished mortality. In Boston, from 1728 to 1752, the deaths were one in 21.65 of the living. In the twenty years, 1846 to 1865, they were only one in 42.08—about half as numerous as a hundred years before.<sup>4</sup>

*Expectation of Life.—Life-Tables.*

The expectation of life, or the average time through which any number of persons will live, from birth or from any other age,

<sup>1</sup> Quetelet, Sur L'Homme, 242.

<sup>2</sup> Vol. V. p. 345.

<sup>3</sup> Vol. II. p. 268.

<sup>4</sup> Calculated from Mr. Shattuck's census of Boston, 1845, and recent mortality records.

is determined by calculation from the records of many people whose whole lives were subject to observation. Thus it is found and shown in Dr. Farr's Life-table, published in 1864, that of a thousand males born in England and Wales, though some may die in their first month and some at the end of a century, and the others at all the intervening ages, yet the whole sum of all their lives amounts to thirty-nine thousand nine hundred and ten years; which, divided equally among the whole, gives an average of 39.91 years for each; and this is their expectation of life at birth.<sup>1</sup>

In the same manner, the expectation of after-lifetime is determined from any other age; as, at twenty, a thousand males will live thirty-nine thousand four hundred and eighty years; and at forty, the same number will enjoy a total of twenty-six thousand and sixty years; showing that at twenty the men of England may reasonably expect to live 39.48 years, and at forty, 26.06 years longer.

The expectation of life at every age from birth to the extremity of human existence, is determined by the same process of calculation; and thus we have the average of future longevity from every year, and the whole constitutes the life-table.

These life-tables are made in almost all civilized countries; and in some of them they have been made at two or more periods within the last three or four hundred years. In all cases, these life-tables are based on the facts of life and death, or the records of the observations of great numbers of persons who have lived and died in those countries, at and before the periods in which the calculations were made.

#### *Life-Insurance and Annuity Companies.*

It is the intention of the Life-Insurance Companies to receive so much in annual premiums, during the life of the insured, as will, with the interest, amount to the sum which they agree to pay at death to the heirs. It is therefore necessary that the calculated life, during which they are to receive annual premiums, shall not exceed the actual average of life from the age insured; otherwise they will receive payments insufficient to cover the amount to be paid to the heirs.

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<sup>1</sup> English Life-table No. 3, p. 36.



The Annuity Companies, for a certain amount received in advance, engage to pay back to the annuitant annually a certain amount agreed upon. For their security, it is necessary that the sum received should be sufficient, with the interest, to cover all the sums annually returned, through the life of the annuitant. It is further necessary that the calculated duration of life should be, at least, as long as the actual average; otherwise they will pay out more than they receive.

If the person insured lives longer than the calculated average, he pays so many more premiums, and the company make it so much more profitable. If, on the contrary, he dies earlier, the company receive fewer premiums, and lose.

If the annuitant lives longer than the calculated term, the company pay him so many more annuities, and lose thereby. But if his life be ended earlier than the average, they save so many annuities, and make a profit on the contract.

The calculations in both companies being made on the average, and the business covering large numbers of persons of every age, the long lives which are injurious to the Annuity Office and profitable to the Life-Insurance Office are balanced by the short lives, which affect both of these companies in the opposite ways.

Both these classes of companies endeavor to have their life-tables represent exactly the average duration or expectation of life from each year of age, and both are therefore safe, if they are correct in their calculations.

As the life-tables are intended to represent the actual average value of life at the time they are used for insurance or for selling annuities, it is needful that observations of the bills of mortality should be made anew, from time to time, to adapt them to the actual experience of life and death. They may be therefore taken as evidence of the longevity of the people at the time they are used.

Taking, then, these life-tables, in their respective countries and at their respective times of observation, as the representatives of the value of human life, or of the average number of years enjoyed by the people from birth or from any specified age, they become valuable and available means of comparing the longevity of different periods of the world, and of different nations, with each other, whether contemporary or otherwise.

*Ancient and Modern Longevity.*

Comparing the longevity of people in earlier and in later periods of the world, as shown by their life-tables, we find another proof of the increase of human life with the progress of time.

According to the tables of Ulpian and the faith and practice of the Roman courts from the third to the sixth century, the average length of life granted to, and enjoyed by, all persons under twenty years of age was thirty years; that is, a thousand, taken as they are usually found, of all ages under twenty — infants, children, and youth — if observed until the last one died, were ascertained to have lived a total sum of thirty thousand years, or an average, for each one, of thirty years after the time of the observation.

Mr. Finlaison's calculations, based on the records of the lives of the annuitants of the British debt connected with the tontine of 1790, show that the average longevity of these people of England was fifty years from and after all ages under twenty.<sup>1</sup>

According to Ulpian's tables, the average life of twenty-eight years was added to those of the favored classes who had already lived from twenty to twenty-five years. Mr. Finlaison showed that this additional boon was forty-one years and seventy days, for the modern Englishman of the same age in similar condition. In the next quinquennial period — twenty-five to thirty years old — the expectation of life was twenty-five years for those who lived in Rome in the third, fourth, fifth, and sixth centuries, and thirty-eight years and fifty-four days for those who lived in Great Britain in the eighteenth and nineteenth centuries.

Take another and later period of life — fifty to fifty-five years of age. The Roman had a reasonable expectation of living thirteen years longer, and the Briton had twenty-two years and two months added to his earthly existence.

The comparison of the ancient Roman with the modern English extension of life from all other ages shows a similar improvement with the progress of the world.

The Roman tables were calculated from observation of the

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<sup>1</sup> McCulloch, *British Empire*, I. p. 421.

more favored classes, the rich, the cultivated ; but the great mass of the people, mechanics, workmen, the slaves, and the poor, who have a shorter life, were not included.

At the present time, among all the people of England, including the poor as well as the favored classes, the expectation of life at the age from birth to twenty is, for males, over forty-five (45.74) years, and for females, forty-six (46.46) years ; and at the age from twenty to twenty-five, it is thirty-eight years for males, and about thirty-nine (38.98) years for females.<sup>1</sup>

In the United States, according to the calculations of Mr. L. W. Meech,<sup>2</sup> of the Census Office, for all classes of males and for all parts of the country, this expectation is, from birth to twenty, nearly forty-seven years, and from twenty to twenty-five it is thirty-nine years.

Here was an increase of longevity, from the beginning of the third century to the end of the eighteenth, of fifty per cent among the more favored classes ; and, sixty years later, the life of all classes in England and the United States was fifty per cent longer than that of the best among the Romans of the earlier day.

### *Geneva.*

There is a record of mortality, kept at Geneva, in Switzerland, for almost four hundred years.<sup>3</sup>

The expectation of life at birth was —

In the 16th century, 21.21 years.

" 17th " 25.67 "

" 18th " 33.62 "

1801 to 1833 39.69 "

1814 " 1833 40.68 "

That is, the whole sum of life granted to a thousand persons, from birth to death, at whatever age, was twenty-one thousand two hundred and ten years in the sixteenth century, and forty thousand six hundred and eighty years in the nineteenth century ; giving in the former an average of twenty-one years and one

<sup>1</sup> English Life-table, 1864, pp. 36, 38.

<sup>2</sup> Massachusetts Insurance Commissioners' 13th Report, Pt. II. p. cvi., 1867.

<sup>3</sup> Edward Mallet, in *Annales d'Hygiène*, Vol. XVII.



fifth, and in the latter an average of forty years and two thirds, and showing an increase of human life of nearly one hundred per cent in those three hundred years.

This improvement is mainly in the diminished mortality of infants and children. In the first period, one half were dead in their ninth year. In the last and present period, one half lived forty-three years and one fifth. In the first period, only thirty-nine per cent of those who were born reached the period of maturity at twenty and entered upon self-sustaining and responsible life. In the last period, sixty-six per cent passed into the working period and became self-supporters.

In Sweden, the expectation of life at birth was, from 1755 to 1775, thirty-five years and three months; and from 1841 to 1855, forty-three years and five months.<sup>1</sup>

Fifty years ago, the Life-Insurance Company of Philadelphia used a table according to which this expectation was twenty-eight years and five months from birth.<sup>2</sup> The life-table of the United States, calculated in 1860, made it very slightly over forty-one years for males.<sup>3</sup>

Professor Wigglesworth's table, made in 1789 on the observation of the mortality in Massachusetts, states the expectation from the tenth year to be thirty-nine years and a quarter.<sup>4</sup> The table now used by the New-England Mutual Life-Insurance Company makes the same to be forty-seven years and five months; and Mr. Meech's table for the whole United States, including the Southern and the new States, gives males at that age a chance of living nearly a year longer than that given by the New England table.

In Holland, of ten thousand children ten years old, during the one hundred and twenty-five years, 1613 to 1738,<sup>5</sup> five thousand six hundred and sixty-five survived to their fifty-first year. In the present century six thousand four hundred and forty-one lived to the same age.<sup>6</sup>

<sup>1</sup> London Statistical Journal, XXV. pp. 126; 150.

<sup>2</sup> Seybert's Statistical Annals, p. 51.

<sup>3</sup> Massachusetts Insurance Commissioners' 13th Report, 1867.

<sup>4</sup> Sheet printed by N. E. Life Insurance Company.

<sup>5</sup> Kerseboom.

<sup>6</sup> Statistisch Jaarboek, 1867, p. 406.

*English Tontines, 1693 and 1790.*

The most remarkable and exact proof of the increase of human life during the hundred years from the first of the eighteenth to the first of the nineteenth century, is shown by Mr. Finlaison in his comparison of the results of the two tontines of the British government.<sup>1</sup>

In 1693, King William issued a tontine, a system of annuities, to be paid to the annuitants as long as they or any persons selected by them should live. In this contract, the sums that were to be annually paid by the government to the annuitant bore a proportion to the sum originally received, according to the expectation of life of the person selected as the basis. As this expectation was based on observations of the length of lives at that period, it was a safe operation both for the government and the annuitants. The government borrowed sums of money of the annuitants, and repaid their principal and interest in annual instalments.

In 1790, William Pitt, prime-minister, issued another tontine, on the same basis of expectation of life, engaging to pay the annuitants annually the same percentage of that which they had paid in, during the lives of themselves or of the persons selected. This went on very well for a few years, but at length the government saw that the lives of these annuitants did not terminate so fast as did those of the former tontine, a hundred years before, and it was proving to be an unprofitable contract for the treasury, but a very profitable one for the other party. And, in 1830, the sale of annuities on this basis was stopped, for the people lived longer than they did when the calculations were originally made, in the seventeenth century; more annuities were paid, and the whole of these payments, before the lives of the annuitants should cease, would amount to much more than the sums originally received, with the accumulated interest. The government were thus paying an enormous and ruinous interest on the money they had borrowed in this way.

Mr. Finlaison's analysis and calculations showed that, while,

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<sup>1</sup> Dr. Southwood Smith, in Trans Brit. Social Science Asso., 1857, p. 498.

under the age of twenty-eight, ten thousand of each sex had died in the tontine of 1693, only five thousand seven hundred and seventy-two males and six thousand four hundred and sixteen females had died in the tontine of 1790, in the same length of time. The mortality under the age of twenty-eight had diminished forty-two per cent among males and thirty-five per cent among females, during the hundred years.

It was shown that, from the age of thirty, the annuitants of the first tontine lived twenty-six years and eight months, and those of the second tontine lived thirty-three years and nine months; and the whole result is, that, within a century, one quarter was added to the life of the class of people who had thus loaned their money to the English government.

#### *Change in Diseases and their Character.*

Many of the dangers that beset humanity in former times have disappeared, or have been very greatly modified, and disarmed of their destructive power. The causes of sickness that robbed man of his strength, filled him with pain, or withered his life away, have been diminished in force and number, and many have been entirely removed. Diseases themselves have changed in their character — some have become mild, some harmless, some have ceased to appear. Some, that formerly came as epidemics, and spread over and wasted whole districts, sweeping away multitudes in a single season, now appear only in a sporadic manner here and there, attacking individuals, but not whole peoples.

#### *Records.*

Although the simple facts of death have been recorded for a long period in many places and in several countries, yet the diseases or causes of death have been recorded in comparatively few. The fullest accounts are those of London, collected and published by Dr. Short, who quotes them from Corbyn Morris. They are copied apparently complete from 1675 to 1757 — a little more than eighty years — from the original records of the parishes.



We have full accounts of the causes of death in London, through the last fifty years, and of England for thirty-two years, and of many of the European nations for several of the late years, and of Massachusetts for twenty-eight years.

These enable us to make some comparisons of the prevalence of disease in former and latter times.

*Small-pox*, which was almost constantly present, and, from 1675 to 1757, destroyed seven to ten per cent of all the people in London, where the record was made,<sup>1</sup> is now almost entirely banished by the influence of vaccination. And in the ten years, 1851 to 1860, only about one per cent in London, and less than one per cent in all England, died from this cause.<sup>2</sup>

*Measles* was formerly very malignant and fatal: five, seven, and even ten per cent of all the deaths in England were due to this cause.<sup>1</sup> In the last twenty-five years about two per cent of the mortality was produced by this disease.<sup>3</sup>

*Convulsions* destroyed seventeen per cent, or one sixth, from 1675 to 1697; twenty-seven to thirty per cent, or more than one quarter, from 1701 to 1757, in London;<sup>1</sup> and in the thirteen years, 1848 to 1860, only three and ninety-four hundredths per cent.<sup>2</sup> In the last twenty-five years, in Massachusetts, less than two per cent died from this cause.<sup>4</sup>

*Fevers* were formerly one great dread of the people, and with good reason. Nearly one sixth—15.94 per cent—of the people in London perished from this cause in the last quarter of the seventeenth century, and nearly as large a proportion in the next fifty years.<sup>1</sup> But in the ten years, 1851 to 1860, this proportion was found reduced three quarters—to 3.66 per cent of the whole mortality.<sup>2</sup> In Massachusetts the proportion is 5.35 per cent.<sup>5</sup>

*Teething of children* destroyed more than one seventeenth—5.9 per cent—from 1675 to 1727; a slightly diminished proportion in the next thirty years;<sup>1</sup> and less than one per cent in the fifteen years, 1850 to 1865.

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<sup>1</sup> Short.

<sup>2</sup> Supplement to Reg.-Gen. 25th Report.

<sup>3</sup> Reg.-Gen. Reports.

<sup>4</sup> Registration Reports.

<sup>5</sup> Registration Report, 28th.

*Consumption*, the dread scourge of the present day, was more dreadful in the former ages of the world. In the seventeenth century, 17 per cent, and in the first half of the eighteenth century, 16.93 per cent, of all the deaths were produced by this cause.<sup>1</sup> But at the present time this proportion is reduced to 10.4 per cent in London, and to 12 per cent in England and Wales.<sup>2</sup>

Some other diseases, which are not known to the civilized world at the present day, prevailed with destructive havoc in the early and middle ages. Dr. Laycock, the learned professor of medicine in the University of Edinburgh, in the report of the Commission on the Health of Towns, gives much of the sanitary history of York and of other parts of Great Britain and Europe. He speaks of the "black death, a glandular typhus or plague, by which, it is calculated, twenty-five millions perished in Europe during the years 1348 and 1349. In the latter year, in the city of York, it raged furiously from about the Ascension [first week in May], to the Feast of James the Apostle [near the end of July]. As in London, so in York, the common grave-yards were insufficient for the interment of the dead."<sup>3</sup> Clyn, the old monastic annalist, referring to this pestilence, says:—

"It seized the city of Avignon, where the Roman court then was, and where the churches and cemeteries were not sufficient to receive the dead, and the Pope ordered a new cemetery to be consecrated for depositing the bodies of those who died of the pestilence; insomuch that from the month of May to the translation of St. Thomas [Twenty-first of December], fifty thousand bodies and upwards were buried in the same cemetery—the river Rhone."<sup>4</sup>

"That pestilence deprived of human inhabitants villages and cities, castles and towns, so that there was scarcely found a man to dwell therein. That year, 1348, was beyond measure wonderful, unusual, and in many things prodigious." "That pestilence was rife in Kilkenny in Lent. Scarcely one alone ever

<sup>1</sup> Short.

<sup>2</sup> Supplement to Reg.-Gen. 25th Report.

<sup>3</sup> Health-of-Towns Report, I. p. 250.

<sup>4</sup> Clyn's Annals, quoted in Mortality Report, Vol. I. of Part V. of Census of Ireland, 1851, p. 86.

died in a house; commonly husband, wife, children and servants went the one way—the way of death. And I, Friar John Clyn, of the order of Friars Minor, and of the Convent of Kilkenny, wrote in this book these notable things which happened in my time, which I saw with my eyes and which I learned from persons worthy of credit.”<sup>1</sup>

The sweating-sickness made similar havoc among the people in those days of low civilization, sickness and suffering. This was “an epidemic resembling cholera in all its most essential features; the only difference being that in one the skin and in the other the bowels were affected.” It appeared first in England in August, 1485, “being imported, according to Hecker and preceding historians, by the Earl of Richmond’s invading army. This, however, is doubtful. Holinshed distinctly observes, that, in the year 1252, ‘*sweats*, agues, and other diseases’ prevailed in England after a dearth; a murrain among the cattle following in autumn.”<sup>2</sup>

Kaye, a writer of the time, says of the sweating sickness: “Some in one hour, many in two it destroyed, and, at the longest, to them that merrilye dined it gave a sorrowful supper. As it founde them, so it toke them, some in wake, some in sleepe, some in mirth, some in care, some fasting, some full, some busy, some idle, and in one house sometyme three, sometyme five, sometyme seven, sometyme eyght, sometyme more, sometyme all; of the which, if the haufe in every towne escaped, it was thoughte greate fauor.”<sup>3</sup>

The parish register of York says: “Above one half of the estimated population of this parish was carried off in the two summers of 1550 and 1551.” And, in 1609, the clerk again records in the register: “In this yeare was the greate plague in Yorke.” The word “greate” must not be understood in any limited sense, as we now use it when speaking of prevalent or fearful sickness. “What would now be esteemed a very high rate of mortality was then little thought of, so numerous were the causes of disease and death in the Middle Ages.” When

<sup>1</sup> Clyn’s Annals, quoted in Census of Ireland, 1851, Mortality, Vol. I. p. 86.

<sup>2</sup> Health-of-Towns Report, I. p. 251.

<sup>3</sup> Quoted by Dr. Laycock, in Health-of-Towns Report, I. p. 251.



the plague was absent, the "purples" (petechial fever), small-pox, autumnal cholera, and exanthematous typhus were constantly rife. While these destroyed only one in ten or fifteen of the population, a "great plague" or "great visitation destroyed one in two or three in four."<sup>1</sup> Diseases were then so prevalent and fatal in ordinary years, that what now would be called very unhealthy seasons would then be esteemed highly favorable, and received with thankfulness. The seven to ten per cent rate of mortality was considered as the natural lot, and created no more alarm than a one-and-a-half to two-and-a-quarter per cent rate does at the present day. They were as grateful for the good years in which only a tenth or a fifteenth of the people died, as we are when only one sixtieth, fiftieth, or fortieth are carried away. They were aroused to fear and to taking measures for prevention when the epidemics spread thickly and widely and destroyed the people by thousands.

#### *No Sanitary Measures adopted.*

Even in the midst of this wide waste of death, the people took no pains to search out the causes of these pestilences; they only thought of contagion, and of endeavoring to prevent the spread of the disease from the persons and houses affected to those that were yet free from it. And though there were abundant sources of pestilence in their midst; though there were stagnant moats and pools; though there was no underground drainage, but superficial gutters filled with all sorts of filth, decaying animal and vegetable matters, and so choked that the water could not run off; though their houses were unswept and their inhabitants wore their clothing unwashed; though the air within and without was reeking with pestilential exhalations—yet the people and the rulers took no note of these things. The wrath of Heaven, contagion, and sometimes the malice of supposed enemies, were their especial objects of dread, which they endeavored to propitiate, or guard against and prevent.

Friar Clyn says: "This year, 1348, chiefly in the months of September and October, great numbers of bishops and prelates,

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<sup>1</sup> Health-of-Towns Report, I. pp. 253, 254.

ecclesiastical and religious, peers and others, and in general people of both sexes, flocked together by troops in pilgrimage to the water of Tachmoling, insomuch that many thousands of souls might be seen there together for many days. Some came on the score of devotion, but the greatest part for fear of the pestilence which raged at the time with great violence.”<sup>1</sup> In other instances the Church ordered processions and masses, the people flocked to the churches, and some made pilgrimages to the shrines of the saints; and in all ways of devotion and prayer to the Deity, or to those who were supposed to have influence with him, they sought for relief from their dread destroyer.

The authorities, ignorant of the causes of the pestilence, made no efforts to prevent its first appearance or remove the causes of its extension, but bent their energies to preventing its spread by contagion after it had come to their people. The town-clerk of York leaves record of the doings of the town council in their days of trouble, one of which will show how they attempted to deal with this great adversary to human life in 1551:—

“vij die Maij anno iijij<sup>to</sup> R. R. Edw. vi<sup>th</sup>

“It was agreyd, that all the wardens in their wardes shall generally take shuche ordre for saveguard of this citie, that all those whiche be, or hereafter shalbe, infectyd with the plaige, shall kepe their owen howses, and to be preparyed for accordynglie. And if it forton any of them uppon great necessite to go abrode, then such as dothe goe abrode, shall have a white Rodd in ther hands thentent they may be knowen; and that every howse that is infectyd shall have a Rede Crosse sat uppon the Dower; and also that suche as departith uppon the plaige shall be buried uppon the day and not uppon the nyght: and further when any person is departyd, ymmediatelie before the corse shallbe hadd to the buryall, the bell shall be knyelled unto the corse be burried: and further that no dogges go abrode in this citie upon payn to forfait for every dogg that goith abrode vj.s. viij.”<sup>2</sup>

In London, at the period of the epidemic in the beginning

<sup>1</sup> Clyn's Annals, quoted in Census of Ireland, 1851. Mortality, Vol. I. p. 86.

<sup>2</sup> Health-of-Towns Report, I. p. 251.

of the sixteenth century, it was ordered by the mayor that a red cross with the words, "*Lord, have mercy on us,*" be posted on the front doors of all the houses whercin the pestilence existed, and all persons going out of such houses were required to carry a white rod two feet long in their hands.<sup>1</sup>

Besides these endeavors to propitiate Heaven and to prevent the spread of the pestilences, the people seemed to suspect that there might be causes of these diseases, but these causes were the wickedness of their fellow-men. "In 1348, they thought that the wells and springs had been poisoned, and thousands of Jews were slain with fire and sword as the poisoners, in conjunction with hundreds of Christians, their supposed accomplices."<sup>2</sup> In the weak philosophy of those days, it was easy to cast odium on, and stir up popular wrath against, unpopular persons, like the hated Jews or others, as the authors of all this wide-spread disease.<sup>3</sup>

But there was one philosopher at that time who saw the nature of the pestilence and the cause of its origin. Caius, or Kaye, in his "*Boke or Counseill against the Disease commonly called the Sweate or Sweating Sicknesse,*" says: "The v. cause is close and vnstirred aire, and therefore putrified and corrupt out of old welles, holes in y<sup>e</sup> grouūd made for grain whereof many I did se in and about Pesaro in Italy, by opening thē aftre a great space, as both those coutrimē do cōfesse, and also by exāple is declared for y<sup>e</sup> manye in openīg thē unwarely be killed."<sup>3</sup>

Good counsellor Kaye preached in vain; the people gave dull ears to his advice. The dirty places remained uncleaned, the streets were not drained, the sources of disease were not closed. The cholera broke out in 1832 in the very spot where the plague and the sweating-sickness first appeared in York, three or four hundred years before, and typhus has had for centuries its favorite haunts undisturbed, and it has them now in some towns, where typhoid diseases prevail and early death is the general law among the people.

<sup>1</sup> Laycock, in Health-of-Towns Report, I. p. 254.

<sup>2</sup> Ibid, I. p. 263.

<sup>3</sup> Quoted by Dr. Laycock, in Health-of-Towns Report, I. p. 262.



*The Plague.*

The plague is to us but a matter of history, and few have now any conception of its power. It was a dreadful and present reality in the earlier ages of the world, and the most terrible scourge in Europe and in the East.

In London,<sup>1</sup> of which we have the full records, the average annual mortality was from five thousand to six thousand for some years previous to 1602, when the plague appeared, and there were forty-two thousand and forty-two deaths in the city in that single year, of which thirty-six thousand two hundred and sixty-nine were from this epidemic. From an average of about twelve thousand, previous to 1625, again the mortality increased, and fifty-four thousand two hundred and sixty-five died in that year, thirty-five thousand four hundred and seventeen from the plague.<sup>2</sup> Again, forty years later, in 1665, this epidemic appeared, and carried the mortality up to ninety-seven thousand three hundred and six, of which sixty-eight thousand five hundred and ninety-six were from this single cause.<sup>3</sup>

No record tells of the mortality from plague previous to 1602. But in all the period from 1602 to 1665 it had its ceaseless work, destroying from one thousand to ten thousand and four hundred in each year.<sup>2</sup>

The plague made similar havoc in Dresden, Saxony, multiplying the mortality in some years five or six fold by its destructive presence. The same results are shown by the records of other towns where it was most prevalent and fatal.

From the earliest times, through the Middle Ages, it has appeared in the several countries of Central and Southern Europe—Germany, Holland, England, France, Portugal, Spain, Italy, Turkey, Russia.

The records tell us of fifty-seven great pestilences that appeared, and greatly ravaged some parts of the world, from the time of Christ to 1789. In one of these, in 1656, two hundred and forty thousand are estimated to have perished in the city of Naples, and four hundred thousand in that kingdom.<sup>3</sup>

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<sup>1</sup> Quoted by Dr. Laycock, in *Health-of-Towns Report*, p. 262.

<sup>2</sup> Webster, *Epidemics*, II. p. 3.

<sup>3</sup> *Ibid*, I. p. 306.

The cities were the especial haunts of the plague. They were then unpaved, undrained, and unswept, and the streets were the receptacles of all the filth of houses, shops, and barns, and pestilential air pervaded street, dwelling, store, and working-place, and the people were inevitably breathing deadly exhalations and the causes of sickness.

Now, for near two hundred years, the plague has disappeared from Great Britain, and mostly from the central and northern parts of Europe. It still occasionally visits Turkey, Egypt, and Asia, where civilization has not yet removed its causes.

*Other Diseases less virulent and destructive.*

In the progress of the world from infancy to maturity, the foes of human life have diminished and its friends have increased. Epidemics, pestilences, plagues, and malignant diseases have been gradually disarmed of their destructive power, and some have entirely disappeared; and many others — fevers, small-pox, measles, scarlet-fever, &c.—have become comparatively mild and rare, and man has less to fear in his work and his walk through his present stage of being. Moreover, his constitution is better developed and sustained, for reasons that will appear in these pages; and thus man's life is more effective and enduring.

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PART II.

*Improvements in Life not equal in all Ages, but always connected with the Progress of Civilization.*

The improvements in human life have made varied progress in the successive ages of the world. Sometimes they have been rapid, sometimes slow, and sometimes the work has gone backward; nor have they kept equal pace in all nations. They have been made in quick succession in some, and at the same time they have been stationary or were lost, in others.

But the general progress has been onward and upward in all

civilized nations ; for it has gone on side by side with civilization — a companion to it and a part of it. Whatever has been done for this has been done for human life. The elements of civilization are among the causes of health and longevity.

*Effects of Improvements in Arts, &c., on Health and Life.*

" Civilization, in increasing the comforts of life, has increased its length."<sup>1</sup> The growth of wealth, the improvements in agriculture, the advance in the mechanic arts, the increase of comforts, the amelioration of personal, domestic, and social habits, the general culture, the diffusion of education, the elevation of morals, the refinement of manners — all the ameliorations of personal and social life have their due influence on the development of vital power, on the maintenance of life, and the prolongation of man's days on earth.

Most, if not nearly all, of the improvements in the means and facilities of business, labor, and the arts, or in domestic and social life in their several ways and degrees, have presently or remotely this effect of increasing the vital power of man.

The exhibitions of inventions, whose name is legion, in the Patent Offices and elsewhere — models and descriptions of things new and of things improved — are indications of progress in civilization, of increase in means of sustenance and human comfort, and consequently in human power and longevity.

The numberless varieties of stoves for warming and cooking afford better protection against cold and storm, and give opportunity to a large class of people for easier and better preparation of food than they could have without them ; carding-machines, spinning-jennies, power-looms, sewing-machines, with their multiplied modifications and improvements, all contribute not only to the production of better and more varied clothing, suited to the wants of the people in every season and on every occasion, and give better protection from the dangers of the elements, but by cheapening the cost of garments they put these more effective means of defence within the reach of a much larger class of the people than in the days of the fathers.

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<sup>1</sup> Quetelet, Sur L'Homme, 242.



Ploughs, mowing-machines, horse-rakes, apple-pearers, steel forks, all the kindred adjuncts of agriculture, increase the productions of the earth, while they lessen the labors of the cultivator or make them more effective. By aid of these, grain, hay, roots, fruits, cattle, sheep, &c., are produced more easily and abundantly, of better and more nutritious quality, and at less cost. The whole people, and especially the poor, are better nourished and strengthened, better armed to meet the responsibilities and to bear the dangers of life.

The steam-engine, man's powerful, tireless, and versatile co-operator, in its multifarious uses in manufactures and locomotion; ships, steamboats, railways, improved common roads, carriages for travel and for transportation — these, and thousands of other inventions and improvements, enable men to accomplish larger and more varied purposes; they lessen the burden of the laborer and increase his productiveness, and offer to the whole world means of sustenance such as the most favored in former ages could not procure.

Few, very few, of the improvements that belong to the civilized state are without their good effect, present or remote, direct or indirect, on human health. Small, infinitesimally small, and in many cases unperceived, may be the good that some produce; yet it is not an assumption without warrant, to say that whenever and wherever the means of sustenance and of generating vital force, or the means of protection against the elements or against any deteriorating or destructive influences, or the conveniences and comforts of life are increased, or whenever by lessening the cost of production, or by facilitating communication and transportation, these conveniences and comforts are placed within the reach of any persons or classes that could not obtain them, or made freely accessible to any who would otherwise use them but sparingly — these improvements, of whatever variety and character, have their due influence in increasing the power and longevity of mankind.

Warm, comfortable, convenient, and pleasant houses, with ample rooms and space for family movements, appropriate furniture, easy beds and chairs, to give good support to the frame

when working, or when seeking rest; easy carriages for locomotion, smooth roads; varied clothing, suited to the different seasons and well fitted to the body, trunk and limbs; food well cooked and digestible, pleasant to the palate and light to the stomach — these and manifold other accompaniments of cultivated society, sometimes called mere luxuries and contemptuously despised by the hardy, are yet more than mere luxuries; they in their several ways and degrees are necessary for the fulness of life, in power and duration, which is obtained only in the state of the highest civilization.

### *Surface of the Earth improved.*

The earth itself has become more favorable to human existence. The forests have been cut down, wet lands have been drained, swamps have given place to dry and arable fields. The ground on which we stand and work sends forth less miasmatic and pestilential effluvia productive of fevers, dysenteries, &c.

European sanitary reports contain abundant evidences of the evil influence of marshy and wet grounds on the people that dwell upon them, and of the good effect of their drainage. Some large and many small districts that were formerly water-soaked or covered in part with ponds and stagnant pools have from time to time been ditched, drained, and dried, and the condition of the health and life of their inhabitants before and after their improvement are recorded and published. A few of these instances will be sufficient to represent the whole.

The district of Wisbech in England, formerly wet and marshy, was drained in the course of twenty years ending 1816. The improvements in vitality are shown by the records. "For every hundred births in the respective periods, the deaths were, ninety-four from 1796 to 1805; seventy-nine from 1806 to 1815; and sixty-four from 1816 to 1825. In the first of these periods the rate of mortality was one in 31 living; in the second, one in 40; and in the third, one in 47."<sup>1</sup>

"The medical officer of Eastry says:—'Some years back a great part of the parishes adjoining the marshes was under water

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<sup>1</sup> Chadwick, Sanitary Condition of Laboring Classes, p. 80.

from the end of autumn to the early part of the following spring; then agues [intermittent fevers] and fevers of all characters prevailed to a great extent. But for the last few years, owing to the excellent plan of draining, very few diseases have occurred, in my opinion, that can be said to be produced by malaria; there is very little ague, scarcely any continued fever, and a case of typhus has not been known along the borders of the marshes for the last three or four years.'"<sup>1</sup>

Many other reports bear similar testimony to the good effect of drainage, making the wet and fever-haunted places dry and healthy.

"*Banff*.—Healthy people, long-lived — much drainage."

"*Fordoun*.—So much draining, that now no swamps: formerly agues common; now quite unknown."

"*Oswell*.—Ague prevailed formerly, but not since the land was drained."

"*Kinross*.—Agues prevailed sixty years ago, in consequence of marshes; now never met with."<sup>2</sup>

On a smaller scale, in most countries, the proprietors of swamps have drained them for the purpose of cultivation; and these water-soaked and submerged lands which had been merely useless mud, sending forth miasmatic exhalations and producing fevers, rheumatisms, and consumptions among the people living near them, have been converted by drainage into dry and rich fields that yield abundant crops of grain and now send forth no causes of disease.

The motive for these improvements of lands was pecuniary gain, and the reward in that way is generally large and sure; but a far better and equally sure reward, though unsought, is found in the improved health, the increased vigor and working power, and lengthened years of the farmer and his family, and of others who live on or near these lands.

### *Cities and Compact Towns.*

Life has ever been and is lowest in the cities, where people are gathered in dense masses. The causes of sickness and the

<sup>1</sup> Chadwick, *Sanitary Condition of Laboring Classes*, p. 82.

<sup>2</sup> *Ibid*, p. 83.



dangers of death are more abundant and effective there than in the open country. These causes and dangers are partly due to the fact of close aggregation of the people, and to that extent are unavoidable; and in part to ignorance, selfishness, and neglect, and to that extent they may be removed.

Within the last forty or fifty years the attention of the people and rulers, and especially of the physicians and political economists, has been called to this excess of city mortality over that of the country districts. In Great Britain, and some other European countries, minute investigations of the condition of cities have been made, and the causes of the great sickness and death sought out. It was discovered that there were the most sicknesses and most frequent deaths, especially among children, in those towns that had the narrowest streets and lanes, and where these were filthy, unswept, and undrained. In different parts of the same city, of which some had wide, open, and well-cleaned streets, and others crowded, close, and filthy ones, a difference in mortality like that between country and city was observed.

The British Parliament passed laws authorizing towns to make improvements and to raise money to pay the cost. Under this authority many towns and cities have drained their streets with sewers. They have paved streets that were bare, cleansed filthy places, opened closed courts, widened narrow lanes, removed nuisances, and introduced water from pure streams or fountains, to be used in households instead of the corrupted water of the wells. These improvements have been followed by marked changes in the sanitary condition of the inhabitants. Sickness has diminished; some diseases that were very frequent—fevers, dysentery, cholera, &c.—have become rare; and from some places they have disappeared. The rate of mortality has been reduced, and longevity has materially increased.

Manifold records of the health of these towns, before and after the improvements, show how greatly health and life have gained by the outward changes.

Salisbury drained, paved, and cleansed its streets in 1854 and 1855. The deaths, which were sixty-nine in each of the winter quarters of the twelve previous years, were only fifty-four in

each of the twelve winters succeeding; showing an improvement of twenty-seven per cent in vitality.<sup>1</sup>

In Liverpool, the rate of mortality, previous to 1847, was 3.84 per cent; or, one in twenty-six of the living died in each year. This great amount of death opened the eyes of the people and the rulers, and they began a system of cleansing and purification. They made sewers, introduced water, swept the streets, widened the narrow places. There were many closed courts, surrounded on all sides by buildings, with only a narrow passage-way under them at one end for an outlet and with no opportunity for the fresh air, and not much for the rays of the sun, to enter. These were opened at one end, and the winds allowed to visit them. Water was introduced, and the dwellers in many streets, lanes, and courts, who had before used and drunk only the polluted water of their wells, had then opportunity to use it pure and wholesome from the country.

At once there was a change for the better in the health of the people, especially of the poor. Sickness diminished, and the death-rate was reduced from 3.84 per cent to 2.7 per cent—nearly one third.

Many other towns did a similar good work for themselves, and received a similar reward. The rate of mortality was reduced in London from 2.38 to 2.23 per cent, in Manchester from 3.71 to 2.71 per cent, in Glasgow from 3.39 to 2.78 per cent, by the same means.<sup>2</sup>

A great number of lodging-houses were inspected by the government commissioners or their agents. These had, in the aggregate, eighty thousand occupants. They were found filthy, unwashed, unswept, unventilated, and crowded with people. Typhus fever prevailed as an epidemic in these unhealthy dwellings. The new law limited the number of lodgers, and ordered purification under the direction of the police. These houses were cleansed and ventilated, and the lodgers reduced to a reasonable number, and the fever appeared no more in them as an epidemic.<sup>3</sup>

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<sup>1</sup> London Medical Times, August, 1867.

<sup>2</sup> McGowan, in Transactions of Social Science, 1863, p. 728.

<sup>3</sup> Chadwick, in Transactions of Social Science, 1860, p. 722.

In Macclesfield, the rate of mortality was 4.2 per cent, or one in twenty-four of the living, in the years 1845 and 1846, and 3.3 per cent through the seven preceding years; whilst that of the surrounding open country was 1.6 per cent, or one in sixty-two of the living. The rate varied in the different parts of the town according to their condition as to cleanliness. In the worst it was frightful, and in all it was bad.

Works of improvement were begun in the worst streets, lanes, and courts, those the most notoriously filthy and unhealthy. These parts were sewered, cleansed, and paved, and the houses drained; the yards and courts were cleansed, the dwellings ventilated, and water freely sent to the inhabitants. The general rate of mortality of the whole city was reduced from 3.3 to 2.6 per cent. The proportion of deaths to the number living, after the improvement, was 21 per cent less than before. But the worst districts, which had been the most foul and most sickly, and where the work of cleansing and purification had been the greatest, showed the largest improvement in health and life. The diminution of the rate of mortality varied among these, according to their different degrees of previous degradation and suffering. In some it was diminished 34, in others, 40, 42, and in one 60 per cent. That is, while one hundred died in each of these districts, before they were improved, only sixty-six, sixty, fifty-eight, and forty died in them severally, after that good work was done.

In the original state of the town, the average age of all who died was twenty-four years. But afterward it was twenty-nine years, showing a gain of 20 per cent in longevity. Comparing the improved districts with those not yet touched by the hand of the scavenger and sweeper, the average age in the cleansed is now thirty-four years, and in the foul only nineteen years, being a difference of 78 per cent.<sup>1</sup>

### *Dwellings.*

Man, originally rude, ignorant, and poor, shelters himself in the holes and caverns of the earth, or builds huts of sticks and

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<sup>1</sup> John May, in *Transactions of Social Science*, 1857, p. 403.



brush. His children advance, and make themselves cabins of stones, and mud, and clay. Another generation emerge from these and dwell in houses; and the houses are successively improved and made more comfortable and healthy, from age to age, as intelligence and wealth increase.

Several generations ago, the dwellings of the laborers and the poor had no floors. The inmates stood and lived on the ground, which was often wet and muddy. Seeking more comfort, they covered this earth floor with rushes or straw, which they seldom renewed, and suffered to become the receptacle of much of the waste and filth of the family. All these habitations, with the rotting straw and the mud beneath, sent forth foul and noisome exhalations and caused sickness in the inhabitants.

Erasmus, the learned scholar and writer, in the beginning of the sixteenth century, in his description of England, said: "The floors of the houses generally were made of nothing but loam, and are strewn with rushes, which being constantly put on fresh, without a removal of the old, remain lying there, in some cases, for twenty years, with fish-bones, broken victuals, and other filth, impregnated with the excretions of dogs, children, and men."

Even the houses of the rich had no carpets. The king himself had no covering for his floors, except straw, which was sometimes spread to receive and conceal the dirt.

The structure of the houses of the great mass of the people gave them neither good protection from the elements abroad nor pure air within. They were loose and leaky, exposing the inmates to winds and storms. They had imperfect means of warming, and in many houses these were entirely wanting, while no means of ventilation were provided.<sup>1</sup> They were equally ill-lighted. In early times they had for windows only the doorway and other open holes, which when closed left the family in darkness; afterward they used horn or other semi-translucent materials. But in 1557, Holinshed said, the general run of houses were beginning to be improved. Instead of glass to their windows, they used to have lattice-work, or panels of horn, glass

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<sup>1</sup> McCulloch, Stat. Aect. Brit. Empire, II. 522.

being scarce and dear.<sup>1</sup> Earlier than this, even horn windows were a luxury accessible only to the rich, and beyond the reach of the great mass of the people. In 1584, Harrison, in his description of England, said: "Of old time our countrie houses, instead of glasse did use much lattise and that made either of wicker or fine rifts of oke in checkerwise. I read also that some of the better sort in and before the time of the Saxons did make panels of horne instead of glasse, and fix them in wooden calmes (casements); but as horne in windowes is now, 1584, quite laid downe in everie place, so our lattises are also growne into disuse, because glasse is become to be so plentiful, and within verie little so good, cheape, if not better than the other." "Glass is now, 1839, introduced into almost every cottage of Great Britain,"<sup>2</sup> and most of the dwellings of the civilized world.

When glass was first introduced, it was so costly and perishable, that some families, even if they were able to purchase it, thought they could not afford to run the risk of its loss, when not in actual use; when, therefore, they had occasion to shut up their houses and leave them, they took the glass out and put it in a more secure place, or carried it with them.

The Northumberland Household Book, speaking of Alnwick Castle, in 1573, said: "And because throwe extreme winds, the glass of the windows of this and other my lord's castels and houses here in the country dooth decay and waste, yt were good the whole leights of everie windowe, at the departure of his lordshippe from lyinge at any of his castels and houses and dowering the tyme of his lordshippe's absence, or others lyinge in them, were taken doune and lade up in safety. And at sooche time as either his lordshippe or anie other sholde lye at anie of the said places, the same might then be set uppe of newe with small charges, whereas now the decaye thereof shall be verie costlie and chargeable to be repayed."<sup>3</sup> In Scotland, as late as 1661, the windows of ordinary country houses were not glazed, and only the windows in the upper parts of the king's palaces had glass; the lower ones having two wooden shutters.

<sup>1</sup> Social Hist. Great Britain, I. 111.

<sup>2</sup> McCulloch, Dict. Commerce, p. 603.

<sup>3</sup> Quoted by McCulloch, Dict. Com., p. 603.

Surely, then, the general population could no more indulge themselves in the luxury of glass at that time than their fathers could in horn windows in previous ages. In the early times the dwellings of the most favored were no better than the poorest now inhabit, and in some respects they were more unhealthy and uncomfortable.

A public report on the condition of the farmers of Scotland says that, in the sixteenth century, the houses even of the rich and the great were destitute of glass windows. The cottages of the poor were not only without glass, but also without chimneys. They were wretched, dirty hovels, built of stones and mud, or of clay and straw, filled with smoke and black with soot. But within a hundred years all the farm-houses, offices, and cottages of Scotland have been rebuilt, and they are now well-contrived, substantial, and commodious, and of course more healthy.<sup>1</sup>

These are the accounts of Scotland. But, with some modification, they may be taken as the type of other progressive nations. The dwellings of America are still improving; they are larger, more airy, better warmed and ventilated, more convenient, and give better protection against the causes of disease, than our fathers enjoyed.

### *Furniture.*

The furniture of mediæval ages corresponded to the dwellings; both were meagre, inconvenient, and uncomfortable, and both insufficient for the purposes of health, according to the notions of the present day. "In the twelfth century, the kingly and noble banquet could not furnish a fork; the fingers of the eaters were thrust into the dishes and employed in tearing the flesh into morsels." "Chancellor Becket caused his servants to cover the floor of his dining room with clean straw every morning in winter, and green branches in summer, that those guests that could not find room at the table might sit on the ground without soiling their clothes."<sup>2</sup> At the end of the thirteenth century the laborers' families had one or more beds that cost from three to five shillings each, and most had a brass pot that cost from one

<sup>1</sup> McCulloch, Stat. Acct. Brit. Empire, II, 518. 1839.

<sup>2</sup> Pict. Hist. England, I. 644.



to three shillings, and this was almost their only cooking-utensil.<sup>1</sup> Nothing was said of tables and chairs. But two hundred and fifty years later, Markham, in his "Instructions to a Good Housewife," says: "A bare table will do as well as if covered with cloth; wooden and pewter dishes and tin vessels for liquor are best, as being most secure." Markham was one of the cautiously progressive spirits of his age. He halted between the conservatives, who held to old customs and were satisfied with wooden dishes and spoons, and the progressives, who were ambitious of a better style of domestic life, and wanted their table furniture to be made of pewter and tin. His advice is given to good housewives, presumptively to those who were thrifty and prosperous, and could therefore afford the cost of the new luxuries. So he recommends a mixture of these kinds — wooden in part, and tin and pewter in part.

About the same time, Holinshed speaks of the introduction of pewter utensils instead of treen (wooden) ones — particularly platters — and silver and tin spoons as substitutes for wooden articles, as remarkable proofs of luxury.

In another place Holinshed says, that in the village where he lived, "there were old men who could remember when a man could hardly find four pieces of pewter in a good farmer's house."<sup>2</sup>

• These new articles of luxury were not within the reach of the poor in those days, for the "pewter platter cost twelve pence and a tynnen quart ten pence, and a square tynnen pot six pence;"<sup>3</sup> and as the wages of the man haymaker was fourpence, and of the woman haymaker twopence a day, beside their board,<sup>4</sup> they must hesitate long before venturing upon such extravagance as pewter and tin for their tables.

Their bedchambers were furnished in a manner not more generous and comfortable than the kitchens and dining-rooms. Bishop Latimer was the son of a wealthy farmer of Leicestershire. In a sermon preached before the king, Edward VI., March 8, 1549, he spoke of the manner of life among the peo-

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<sup>1</sup> Sir Fred. M. Eden, *History of the Laboring Classes*, I.

<sup>2</sup> Roberts, *Social Condition of Southern Counties*, p. 324.

<sup>3</sup> *Ibid.*, p. 345.

<sup>4</sup> *Social Hist. Great Britain*, p. 16.

ple of the middle classes, and said: "My father was a yeoman; he tilled as much as kept six men, and his mother's dairy consisted of thirty milch-kine. He kept hospitality with the neighbors, and gave some alms to the poor. The family laid upon straw pallets or rough mats, covered with a sheet; the under coverlet of dog's wain [very coarse mantle], or hap-harlots [very rough cloth], and a good round log of wood under the head instead of a bolster or pillow. If within seven years after marriage a master of a family could purchase a mattress or flock-bed and add thereto a sack of chaff to rest his head, he thought himself well lodged."<sup>1</sup>

This economy was necessary for people commencing house-keeping in those days, from the limited outfit of the bride. The bishop, in the same sermon to the king and the court, says: "My father married my sisters with a dowry of five pounds each." He also spoke of the beginning of the change of treen [wooden] platters for pewter, and of wooden spoons for tin and silver. But it can hardly be supposed that the bishop's sisters, with their twenty-five dollars' outfit — still less other young brides, marrying from or into families less wealthy than his father's and with less than five pounds' outfit — would feel justified in adopting the new fashion of pewter for their table furniture; they were probably content with wood, until they became more prosperous or ambitious.

### *Clothing.*

Among the world's great improvements, those in textile fabrics are the most prominent and beneficial. Cloths of manifold kinds, thick, strong, soft, and warm, are now produced instead of the few thin, coarse, hard, and cold sorts that were used in mediæval times.

McCulloch says: "The luxury of a linen shirt was [in the sixteenth century and previously] confined to the higher classes. The cloth used by the bulk of the people was mostly of home manufacture, and, compared with what they now [1839] make use of, was at once costly, coarse, and comfortless."<sup>2</sup> Cotton was then unknown to the rich as well as to the poor.

<sup>1</sup> Sermons, I. 93.

<sup>2</sup> Statistical Account of the British Empire, II. 512.

The introduction of cotton not only produced cloth cheap and within the reach of the poorest, but afforded garments to be worn next to the body that can be and are frequently changed and washed. Queen Elizabeth, three hundred years ago, with all her wealth and power, with all her ambition and pride in display of dress, and even with the three thousand garments that she left behind, was, in some respects, more poorly and less healthfully dressed than the humblest woman of our day. The new varieties of woollen and cotton goods, their manifold adaptation to the wants of men, women, and children, allow to even the poorest, opportunities of health and comfort and of personal cleanliness, that neither peasant nor prince, neither washerwoman nor queen, enjoyed or even conceived of, in the ages gone by.

### *Food.*

The same progress has been made in the means of nutrition. The improvements in agriculture, the better and more extensive cultivation of the earth, the introduction of new grains and vegetables, have greatly increased the quantity and variety of vegetable food, and the improved means of raising and preserving fodder for the winter have increased the amount of fresh animal food, for the people, throughout the year.

*Potatoes*, which are now on every-body's table, were unknown to the civilized world before the latter part of the sixteenth century. They were a long time in getting into general use, and becoming a common and cheap article of diet for all; and for many years after they were introduced into Europe they were the rarest luxuries, to be bought and eaten only by the nobles and the wealthy. In 1633, in the list of prices established by proclamation of the government, potatoes were ordered to be sold for two shillings (fifty cents) a pound, equal to thirty dollars a bushel. A few years previously, the wages of a bailiff of husbandry, head man on the farm, were fixed by the court at fifty-two shillings (about thirteen dollars) a year; and of mechanics, carpenters, masons, &c., at eight pence (about sixteen cents), with board, a day.

Thirty-two years later, in 1665, Muffet, writing on the subject of food and diet, says: "Potato roots are getting to be quite



common now; even the husbandman sometimes buys them to please his wife."

*Grains* have improved. More of the richer grains, wheat, &c., are raised, and the people have better bread. Morgan, in an old account of the agriculture of Scotland, 1590 to 1605, said: "They, the Scotch, eate harthcakes of oates, but in cities some have wheaten bread, which, for the most part, is bought by courtiers, gentlemen, and the best sort of citizens."<sup>1</sup>

Sir Frederic M. Eden, in his great and valuable work on the History of the Laboring Classes, quotes the Westmoreland Agricultural Report of 1797, which says that, "in Westmoreland, in 1797, a laboring man will eat sixteen pounds of oatmeal a fortnight." The report adds: "The cost of this is one and a half to two and a half shillings, average two. Then his bread, which was almost his whole food, cost him a shilling (twenty-five cents) a week."<sup>2</sup>

Substantiality of diet was the peculiar and exclusive privilege of the higher classes. Eden says: "A maid of honor perhaps breakfasted on roast beef; but the ploughman in those good old times (sixteenth century), as they are called, could, I fear, only banquet on the strength of water-gruel."<sup>3</sup>

Harrison, in his description of England, says: "The bread throughout the land is made of such graine as the soil yieldeth: nevertheless the gentilitie commonlie provide themselves sufficientlie of wheat, for their own tables, whilest their household and poore neighbors in some shires, are enforced to content themselves with rice and barlie: yea, in times of dearth, manie with bread made either of bran, or of otes, or of all together, and some acorns among, of which scourge the poore do soonest tast, sith they are least able to provide themselves better."<sup>4</sup>

"In the sixteenth century wheat was scarcely used at all, rye but little, mostly oats and barley by the laboring people."<sup>5</sup>

"'Brown bread' hath little or no floure left therein at all. It is not only the worst and weakest of all, but also appointed in old times for servants, slaves, and inferior people to feed upon.

<sup>1</sup> Quoted by Eden in Hist. Laboring Classes, I. 515.

<sup>2</sup> Eden, Hist. Laboring Classes, I. 512.

<sup>3</sup> Ibid, 116.

<sup>4</sup> Quoted by Eden.

<sup>5</sup> Eden, I.

Hereunto likewise, because it is drie and brickle in the working, for it will hardly be made up handsomelie into loaves, some add a portion of rie meale, in our time, whereby the rough drieness or drie roughness thereof is somewhat removed.”<sup>1</sup> “In champeigne countries, much rie and barlie bread is eaten, especially when wheat is scant and gesort.”<sup>1</sup>

For three hundred years the laboring people have been gradually getting from oats and barley to rye, and from rye to wheat, and thus improving their nutriment, their capacity for labor, their health, and their longevity.

With the improvements in agriculture, the earth yields more abundantly; the products of the farms of Great Britain have much more than doubled since the days of Queen Elizabeth, and they better sustained the fourteen millions of people in 1820 than they did the six millions in 1550.

In 1691, Sir William Petty, in his elaborate essay on Political Economy, said: “As for the land of England, Scotland, and Ireland, by draining of fens, improving of forests and commons, making heathy and barren grounds bear sain foyne and clover grass, meliorating and multiplying several sorts of fruits and garden stuffe, the land in its present condition is able to bear more provision and commodities than it was forty years ago.”<sup>2</sup> Improvements in the production of food have gone on more rapidly since Sir William’s day. McCulloch, writing in 1839, said: “Wheaten bread is now universally made use of in towns and villages and almost everywhere in the country. Barley is no longer used except in distilleries and in brewing. Oats are employed only in feeding horses. The consumption of rye bread is comparatively inconsiderable. The produce of the wheat crop has been, at the very least, trebled since 1760.”<sup>3</sup>

### *Animal Food.*

The improvement in the production of animal food is greater than in that of vegetable. “According to the estimate of Dr.

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<sup>1</sup> Holinshed, Chronicles, p. 168.

<sup>2</sup> Political Arithmetic, pp. 96, 97.

<sup>3</sup> McCulloch, Dict. Commerce, p. 182.

Davenant in 1710, the average weight of the *net* carcase of black cattle was only three hundred and seventy pounds, of calves fifty pounds, and of sheep twenty-eight pounds.”<sup>1</sup> In 1795, a committee of Parliament, who had the matter of the food supply under investigation, reported that cattle and sheep had, on an average, increased in size and weight about a fourth since 1732. McCulloch thinks that the increase is much greater than this, and that forty-four years latter the average net weight of the cattle after drawing was five hundred and fifty pounds, of calves one hundred and five pounds, and of sheep over fifty pounds, making the increase of food offered to man from these animals from 50 to 100 per cent.<sup>1</sup>

In other civilized countries, both of Europe and America, there has been a similar increase of the supply of vegetable and animal food, and the quality has gained as well as the quantity. These improvements did not stop in 1839, when McCulloch examined the matter and reported; but without doubt they have gone on as rapidly within the last thirty years as in the last century.

### *Fruits.*

There has been a greater improvement in fruits in respect to abundance, nutritiousness, and healthfulness. Instead of the hard, small, sour crab, we have hundreds of varieties of rich, nutritive, and digestible apples. Instead of the wild and worthless sloe, we have manifold kinds of healthy plums. Pears, peaches, grapes, berries, have also been multiplied and made subservient to the sustenance and strengthening of the human race.

So the farm, the garden, the orchard, have all increased their contributions to the diet of man immensely in quantity, and still more in nutritive power.

### *Famines and Plenty.*

The seasons varied more in former ages than they do now; and agriculture, being imperfect, was less prepared to meet or modify the effects of the unfavorable vicissitudes of the weather.

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<sup>1</sup> McCulloch, Dict. Commerce, p. 261.



The crops therefore varied, and the people were very unequally supplied with food. In some years they might riot in abundance, and in others suffer from privation. In 1696, 1697, and 1698, the price of wheat in England averaged ninety-two shillings a quarter, and in the next succeeding six years the average price was thirty-three shillings and sixpence.

In those early days, the people had neither the means nor the habit of intercommunication; consequently there was no general knowledge of the condition of agriculture, or of the amount of food produced, in the various nations of the world, or in the various parts of any single country, and not always even in the different parts of a single district.

### *Roads and Transportation.*

Beside this want of knowledge in the favored countries of the necessities of food in others, and ignorance, among the people whose crops had failed, of the more abundant supply that was offered elsewhere, there was a want of the means of transportation, both by sea and land, from nation to nation and from district to district. There was not then the broad and generous commerce that now, with its comprehensive eye, watches over all the nations of the earth, and, seeing their poverty and their riches, carries the surplus food of those whose crops are abundant to supply the wants of those whose crops have failed or are scanty, and thus equalizes the means of sustenance and compensates for the unequal distribution from the skill of men or nature's bounty.

Roads, as now in our least cultivated territories, were then hardly known; in summer the ways not unfrequently consisted of the bottoms of rivulets, and in winter they were hardly passable. Many roads were impassable for any wheel-carriages, and the transportation was done on horseback. Even in some parts of Scotland, as late as the middle of the eighteenth century, all the goods, merchandise, and produce, even straw, hay, coal, &c., were conveyed in this way. The freight was usually placed in sacks, baskets, or panniers, suspended on each side of the horse, or fastened with ropes to the animal's back in such way as the skill of the carrier could devise.

Wagons were then unknown ; but when the distances between the places were very great, carts were employed, for the horse could not carry on his back a load sufficient to justify the expense of a long journey. These carts were heavy, clumsy, and difficult to be moved even when empty. At the same time, draught horses and cattle were of low breeds, imperfectly nourished, and weakened by exposure to cold and storm in rude sheds, or perhaps with not even this shelter. They were consequently incapable of great exertion, carried but small burdens, and travelled slowly. The common carrier, from Edinburgh to Selkirk, thirty-eight miles distant, required a fortnight for his journey, going and returning, between the two places.<sup>1</sup>

This great labor of transportation added very much to the expense of merchandise when carried from the cities to the country, and to the cost of grain and all agricultural produce in the cities. Bishop Fleetwood says, that sometimes there was a very wide difference in the price of grain in London and in the country districts. One year, 1557, he quotes the market prices of wheat as ten, twelve, and thirteen shillings a quarter in several of the counties, and sixty-four shillings in the metropolis.<sup>2</sup>

#### *Jealousy of the Merchants.*

Beside these inherent obstacles to equalizing the supply of food by means of trade — carrying it from places where it was plentiful to places where it was scarce — there was at that time, among both producers and consumers, a great jealousy of dealers in grain, and several laws were enacted in England to prevent their freedom of action, “especially in the reign of Edward VI., when the engrossing of corn, or the buying it in one market with the intent to sell it again in another, was made an offence punishable by imprisonment and the pillory ; and no one was allowed to carry it from one port to another without a license.”<sup>3</sup>

#### *Unthriftiness.*

The uncultivated people of early times seem to have had little of that calculating thrift and that discipline and self-denial which,

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<sup>1</sup> McCulloch, Dict. Commerce, p. 995.

<sup>2</sup> Chronicon Preciosum, p. 99.

<sup>3</sup> McCulloch, Dict. Commerce, p. 403.

by economy in consumption of food in the autumn and winter, would save enough for at least a meagre support, and prevent destitution in the following spring and summer. When their stores were exhausted, or nearly exhausted, they suffered from privation until the new crop came to their relief. This was manifested in the course of prices of grain through the years succeeding short crops. In 1556, after harvest, the price of wheat in England was eight shillings a quarter, and so continued until the following season. Grain was cheap and apparently abundant, want was out of sight, families lived freely until scarcity was forced upon them in the spring and summer, when the price rose to fifty-three shillings and fourpence a quarter, and so remained until the new harvest reduced it at once to eight shillings,<sup>1</sup> and then the people again lived freely.

In 1317, wheat was twenty shillings—two hundred and forty pence—a bushel, before harvest, and fell to ten pence when the new crop had been gathered.<sup>2</sup>

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### PART III.

#### *Labor less severe than formerly.*

Labor is less severe than formerly. The introduction of machinery has relieved workmen of the necessity of making the most violent exertions. The hardest and heaviest blows are struck by the unfeeling and untiring arms of the mill, the machine, the engine. More than this: the hours of labor are diminished. People have shorter days of toil, and longer nights of rest. And fewer are broken down by excess of exhaustive and violent exertion, by protracted toils, and privation of sleep.

#### *Labor Wages.*

Labor is better rewarded now than in former years. Not only are larger wages paid in money, but the money received procures

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<sup>1</sup> Fleetwood's *Chronicon Preciosum*, 113, 114.

<sup>2</sup> Eden, *Hist. Laboring Classes*.

for the worker better means of sustenance, better protection of clothing and shelter, and more of the comforts of life. In England, in the last of the sixteenth century, a good mechanic, carpenter, mason, painter, wheelwright, earned a bushel of wheat by working nine days and one eighth. In the period from 1600 to 1625, he earned a bushel in five days and one third; and from 1815 to 1821, in one day and an eighth.<sup>1</sup> And now, with the present prices of labor and grain, the same classes of mechanics in the United States earn a bushel of wheat in half a day.<sup>2</sup>

In the first period the mechanic earned three quarts and a half of wheat, and in the last period sixty-four quarts, with one day's labor.

Two hundred years ago, weavers, cloth-dressers and dyers earned each seventeen cents a day, and paid sixty-two cents for the meanest shirt.<sup>3</sup>

Two hundred and fifty years ago, a good mechanic could obtain with the wages of one day's labor two pounds and a half of beef or mutton, or two dozen eggs. He could earn a hen in one day and a third, a turkey in three or four days, a cauliflower in two days, a pound of potatoes in three days,<sup>4</sup> and coarse linen cloth enough for a shirt in six days and a half.<sup>5</sup> A farm-laborer earned fourteen cents a day from April to October, and twelve cents a day from October to April, always boarding himself.<sup>6</sup>

In the early ages the government frequently fixed the price of labor, and sometimes of grain and other articles. Sometimes this was done by parliament, sometimes by the town council, sometimes by the courts. In 1317, when wheat was ten pence a bushel, the harrower of the ground, the weeder, and the hay-maker were ordered to have one penny and a half, about three cents, a day; and master carpenters, masons, tylers, three pence, or six cents, a day. In 1360, the master hind, carter, shepherd and

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<sup>1</sup> Playfair's History of Prices of Grain, Bread, and Labor.

<sup>2</sup> Calculated from prices current in summer, 1868.

<sup>3</sup> Goodman, Social History of Great Britain, I. 16.

<sup>4</sup> Social History of Great Britain, I. 16.

<sup>5</sup> Sir Fred. M. Eden, History of Laboring Classes, I. 556.

<sup>6</sup> Social History of Great Britain, I. 17.



swineherd were to have ten shillings (two dollars and fifty cents) a year; and a woman laborer or dairy-woman, six shillings (one dollar and fifty cents) a year. In 1446, the wages of a master or head farmer were twenty-three shillings and four pence, about five dollars and eighty-three cents, a year; of a chief carter or shepherd, twenty shillings (five dollars); of a woman servant, ten shillings (two dollars and fifty cents) per year. All these had their food from the employer. The wages of mechanics had not risen in those eighty-six years; they still had their three pence a day and their board.<sup>1</sup>

In 1610, the justices of Rutlandshire revised the scale of wages, and ordered that the employers should pay to the bailiff of husbandry, head man on the farm, fifty-two shillings (thirteen dollars) a year with board; to the chief woman servant, being a good cook, a fraction less than thirteen cents a week, and board. A mower was to have ten cents, a man hay-maker or reaper eight cents, a woman reaper six cents, a woman hay-maker four cents a day; all with board.

It was further ordered that all of these should receive double wages if they boarded themselves, except the female hay-maker, who should have ten cents.<sup>2</sup>

The wages of mechanics were fixed by the same ordinance. Carpenters, in summer, had sixteen cents a day with board, and twenty-six cents without it; tailors, eight cents with board, and sixteen cents without it. The general idea of the courts was, to allow one half of the earnings for board; the rest was clear wages, to be used, according to the will of the workman, for other personal and family expenses.<sup>3</sup> Thus the carpenter, tailor, and laborer, who severally had sixteen, eight, and four cents surplus daily wages after paying the employer for their board, had so much left to pay for their clothing, to lay by for their sustenance in sickness and old age, and for the support of their families if they had any.<sup>4</sup>

<sup>1</sup> Fleetwood's *Chronicon Preciosum*, pp. 129-131.

<sup>2</sup> *Social History of Great Britain*, I. 16, 17.      <sup>3</sup> *Ibid.*, p. 16.

<sup>4</sup> "Some of the laws of those early ages fixed the prices of labor and articles of merchandise, and prohibited not only the laborer and seller from asking more, but the employer and the buyer from giving more, under severe penalties.

"In 1350 the council of London ordered the prices of labor:—

In the days of Queen Elizabeth—"the good old times of Queen Bess," the pride of English history, when national prosperity and personal comfort were supposed to have attained their highest point—the average wages of good mechanics were five shillings, about one dollar and twenty-five cents, a week. Wheat was then—1565 to 1599—five shillings and ten pence per bushel; the mechanic could then earn a bushel of wheat in seven days, a coarse linen (dowlas) shirt in five days and a half, a common waistcoat in seven days and four fifths, a pair of strong shoes in eight days and four tenths, a stuff gown for his wife in seven days and four fifths, a linsey-woolsey petticoat in five days and two fifths, a check apron in two days and a half, a pair of shoes in four days and a half, and a pair of stockings in one day and four fifths.<sup>1</sup>

Comparing these wages of the workman with the cost of clothing and other obtainable necessities of life, it is easy to see how small an amount of the comforts they could obtain, how meagre must have been the sustenance of their families, and how slight an opportunity they enjoyed, of developing a sound constitution, and of sustaining themselves against the causes of disease.

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	Summer.	Winter.
Masons, plasterers, and carpenters, per day, without victuals and drink, . . . . .	6d.	5d.
Tilers . . . . .	5½d.	4½d.
Master daubers (builders of cabins of clay and straw) . . . . .	5d.	4d.
Their laborers . . . . .	3½d.	3d.
Tailors making gowns garnished with say (serge) and sandals . . . . .	18d.	
Horse-shoeing, six nails . . . . .	14d.	
“ eight nails . . . . .	2d.	
Taking off horse-shoe . . . . .	½d.	

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“If any one will not work for these wages, he must be imprisoned, until he find good surety. If he go out of the city because he will not work thus, and he be found there afterward, let him have imprisonment for half a year, and forfeit the chattels he has in the city.

“Servants in the houses of good folks shall not take more than they were wont to take before the pestilence, on pain of imprisonment and heavy ransom, and of paying to the city double that which they have taken in excess; and he who shall pay more than he did before the pestilence shall pay to the city treble what he shall have so paid in excess.”—*London, and London Life*, p. 253.

“1363. William Coppe was punished in the pillory for enhancing the price of wheat.”—*Ibid*, p. 313.

“1364. A man was punished in the pillory for giving 15½ pence a bushel, which is 2½ pence more than the law allowed.”—*Ibid*, p. 317.

“1382 (5 Richard III.). An ostler was punished for selling oats for 5½ pence, which by law were to be sold for 5 pence a bushel.”—*Ibid*, p. 460.

<sup>1</sup> Social History of Great Britain, pp. 12, 18.

At the present time, a good mechanic earns three or four times the cost of his board, and has three or four times as large a proportionate surplus for the support of his family, or for investment for future use; and labor, in all its varied forms, receives a much larger reward in sustenance, in comfort, in means of health and vigor, at the present, than was paid in any of the former ages of the world.

A natural consequence of this better relation of labor to wages is, that there is a much larger proportion of the people who have a surplus to save, and many more that provide in their vigorous days for times of weakness and sickness, and who suffer less when their power of labor and production is temporarily suspended or permanently exhausted.

### *Increase of the Means of Life.*

While then the proportion of people who have some property, or some fixed and reliable plan of life, some sure and continuous income and means of support, has increased with the progress of civilization, the proportion of those who are living from hand to mouth, who awake in the morning without knowing how the bread of the day is to be obtained, or even whether it will come in any way to them, has diminished. There are less of those who are the prey of accidents, carelessness, and fortune—now full and now empty, at one time revelling in thoughtless improvidence with their present means, and at another suffering from want—and who, with their varied and uncertain sustenance, have a lower constitution, and are more subject to disease and more liable to death.

There is now less destitution than in former ages. There is a smaller proportion of the poor and dependent who are not, at all times, able to procure their subsistence by their own exertions. There is a diminished and diminishing proportion of those who suffer any privation of the comforts and needful elements of life, in their days of sickness or when their opportunity of earning is taken away.

So the life of the civilized world is better sustained. The human constitution is better developed and prepared to bear the

burdens that are laid upon it, and more able to resist the causes and to sustain the attacks of disease.

*Increase of Kindness and Mutual Help.*

There is another and important element of civilization, that has no small influence on health and on the continuance of life—in the growth of charity and increase of mutual love and respect. In early times, and among barbarous people in all ages, brute force reigned paramount, and selfishness was an active principle among all classes. The strong ruled over the weak and ruthlessly grasped at the property and the privileges of the world; and the weak, by fair means or by cunning and stealth, got what they could from both superiors and equals.

The upper classes seemed to suppose the lower made for their benefit, and the intelligent to consider the ignorant appointed to serve them. There was not only an indifference to human and animal suffering, but even sometimes a pleasure in beholding it. The savage tortured his victims; the old Romans went in crowds to see the gladiatorial exhibitions, where men fought and wounded and slew each other. The Spaniards still throng the theatres of the bull-fights; and people in past ages found amusement in the prize-fights of men, dogs, and fowls, which now afford pleasure only to the rudest and lowest; and when, in olden time, the law condemned convicted criminals to be tied to the cart's tail and whipped through the streets, crowds followed, and urged the executioner to be diligent in his work, and complained if he faltered, or showed any signs of compassion.

Colgan, in his "Lives of the Saints," says that, "in the year 664, there was at that time a great famine in the land; so great was the population, that the soil was not sufficient for it for agricultural purposes." "Wherefore the chiefs of the land planned that the people should assemble in one place, and all the laity and clergy should fast, and pray to God to remove that burdensome number of the 'inferior multitude' by means of some pestilence, that by this measure the rest might live more comfortably. An angel said: 'But because, in opposition to the will of God, you have prayed for the death of the lower classes, by



God's just judgment the higher ranks shall die,' which also came to pass."<sup>1</sup>

Their domestic management was not more loving and gentle three hundred years ago. Markham, in his "Instructions to a Good Housewife," among other recommendations for her proper dealing with the female servants, advises the mistress "not to scold the girls, but to thrash them heartily, when they are refractory."<sup>2</sup>

With increased culture and refinement, with the growth of wealth and the establishment of better social order, there has been an increase of charity, of generous regard for man, more willingness among men to bear and lighten each other's burdens. Hence in cultivated communities there has sprung up among those who are endowed with gifts and powers, whether of body, mind, or estate, a feeling of responsibility for their use and a desire to lend them in aid of those who are in need, more than in the days of the past. The world grows more generous, more sympathetic, and the weak in every element enjoy more and more of the blessings of the strong. They suffer less from want and privation; they receive more aid in the doubtful and dangerous paths of life; their burdens are lightened; their strength is better sustained; their ailments are fewer and less destructive.

### *Sensuality.*

In the world's earlier periods, which, sometimes with pleasant fancy and sometimes with sorrowful yearning for their return, we call the ages of purity and simplicity—in the days of Israel of old and of Greece and Rome, in the Middle Ages, in the times of Ben Johnson, of Shakspeare, in the last century—in all, from the first downward, there was more sensual indulgence, more intemperance, more low and exhausting dissipation than now. The Hebrew prophets, in their bitter denunciations of the sins of the people; the poets; the play-writers; the historians of all those times—who intend to depict society and manners in their true colors, by their descriptions of scenes and customs, their language, and their allusions to matters evidently fami-

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<sup>1</sup> Quoted in Census of Ireland, 1851, I. 51.

<sup>2</sup> Quoted in Social History of Great Britain, I. 105.

liar—all reveal a wide prevalence of destructive sensuality, which was necessarily followed by exhausted constitutions, lessened vitality, and earlier death.

### *Diminished Early Mortality.*

The weak—those who have low vitality, having in themselves little power—stand most in need of external aids for the support of life; they want appropriate food, plenty of warmth, good clothing and shelter, and an unfailing supply of fresh air. Their systems are the most keenly sensitive to the causes of disturbance, and they suffer most readily under loss of comforts, and sink most rapidly when deprived of the necessary means of living. Hence infants are more subject to fatal attacks of disease in rude ages, and among the ignorant and the poor, the selfish and the indiscreet, in any age of the world. In the proportion that society emerges from barbarism and families become intelligent and the means of living are generally diffused, childhood is more healthy and vigorous and less subject to disease and death, and thus the diminished infant mortality is one of the strong and pleasant marks of the progress of civilization.

In Geneva, Switzerland, of all the deaths, 44 per cent in the sixteenth century, and 25 per cent in the nineteenth century, were of children under five years.<sup>1</sup>

Of all the deaths in London, those of infants under one year were 74.5 per cent from 1730 to 1749, of the total mortality; 41.3 per cent from 1790 to 1809; and 29.58 per cent from 1850 to 1860.<sup>2</sup> In France, the deaths of infants under one year were 22.48 per cent, from 1800 to 1815; 20.58 per cent from 1830 to 1840; 18.92 per cent from 1850 to 1860, of the mortality at all ages.<sup>3</sup>

In Massachusetts, Vermont and Connecticut, property is more equally distributed, and there is a larger proportion of the inhabitants who have a competence, who have a plenty of suitable food at all times for themselves and for their children, who have comfortable dwellings, and whose families never suffer from want

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<sup>1</sup> Mallet, in *Annales d'Hygiène*, XVII.

<sup>2</sup> Dr. Farr, in *McCulloch's Stat. Acct. Brit. Empire*, II. 543.

<sup>3</sup> *Statistique de la France*, 1860. *Mouvement de la Population*. App. p. 12.

of nutriment or warmth, than in any other state or nation. This enables them to nourish and protect their children, and gives them better means and opportunities to carry them through the perils of infancy and childhood.

The effect of these favorable circumstances is seen in the bills of mortality, which show that of those who are born in these States a smaller proportion perish in the forming-period and a larger proportion reach the fulness of maturity, at twenty, and are launched on the sea of active and self-sustaining life, than in any other district of country, except one.<sup>1</sup>

The same good effect of prosperity on health in these States is shown at the other extreme of life. They have a larger proportion of persons who out of their earnings in their years of strength, save enough to support them in health and comfort in their declining years. So we find that, of those who survive their period of labor to sixty, a larger proportion here live on to a good old age at eighty, than anywhere else in the world.

The statement regarding the safety of children in Massachusetts should be qualified in respect to the experience in that State since 1851, for the introduction of a large number of foreigners, with their great addition of perishable children, has increased the proportions of its infant mortality. Yet, if the foreign element could be separated in this calculation, it would be shown that children of Anglo-Saxon origin born in these States have a better chance of life than children of other countries.

### *Infant Mortality among the Poor.*

The difference between the vitality of infants of families in different circumstances is shown by comparing the ages of the persons buried in the large Catholic cemeteries in the vicinity of Boston with those of the persons buried at Mount Auburn. The records of nineteen thousand seven hundred burials in the grounds of the foreigners and of twelve thousand seven hundred and six in the resting-place of the natives, were examined for this purpose. Of those who were placed in the cemetery for the poor, 29 per cent were infants of less than a year, and 58 per cent had not passed their fifth year; while at Mount Auburn only 12 per

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<sup>1</sup> Calculated from annual reports of mortality,

cent were infants under one year, and 28 per cent less than five years old.

One half of those buried in the cemeteries of the strangers were less than thirty-three months old. One half of those in the other ground had passed their thirty-third year.

In this comparison, great allowance must be made for the different composition of the families of these two classes of people. The foreigners are nearly all young, few beyond the middle and productive period of life, and their children are numerous. The natives are of all ages, with the average proportion of aged, and only the average proportion of children.

Yet, making whatever deduction may be proper for this difference, here is a very great excess of infant mortality among the poor over that in the more prosperous classes, which can be explained only by the difference in their domestic condition.

### *Education.*

Education and intelligence, the most important elements of civilization, are also among the most effective aids in sustaining human life.

This is seen in the records of vitality and mortality in England and Wales through seventeen years. In six counties, 63 per cent of the women when they were married were unable to write their names in the register, and signed with their marks. There were seven hundred and forty-nine thousand nine hundred and twenty-seven marriages in these counties, and two million eight hundred and fifty-three thousand seven hundred and seventy-four children were born. 18.98 per cent of these children died in their first year.

In fifteen other counties, with a more favored and intelligent population, only 30 per cent—less than one third—of the marrying women were unable to write their names in the register.

In these counties, there were four hundred and fifty-three thousand and thirty-four marriages, and one million eight hundred and thirty-three thousand seven hundred and ninety-nine children born. Only 14.09 per cent of these infants died before they reached the end of their first year.

Comparing the infant mortality of these two classes of counties,



it is found that as often as one hundred die in those of which the people are more intelligent, one hundred and thirty-four die in those where the inhabitants are more ignorant.<sup>1</sup>

The period of observation was the same in both these districts, —from 1838 to 1854 inclusive. The districts were both wide; both included cities and country, sea-coast and inland, manufacturing, agricultural, commercial, and mining people, with no other appreciable difference than that the proportion of ignorance, as indicated by the inability of marrying women to write, was twice as great in the one as it was in the other.

It is not to be supposed that the simple fact of a mother's inability to write her name is the direct cause of the death of her infant children. But this is a representative fact. It indicates ignorance beyond that of chirography—a general want of culture and a deficient knowledge of business and affairs, a lack of discipline of self and of family. It represents poverty, a smaller and more uncertain supply of the means of living—of food, clothing, fuel, shelter—and in all the management of family and children a more frequent failure to meet the necessities of infant life.

### *Effect of Education in Ireland.*

The same difference in infant mortality in connection with the various degrees of ignorance is found among the people of Ireland; their bills of mortality for ten years—from 1841 to 1851—show that the ratio of deaths of infants under one year of age was 30 per cent greater in those counties where two thirds of the females could neither read nor write than it was in other counties, where two thirds of the females could do both.

### *Unequal Movements of Civilization.*

The spread of civilization is wide, and its progress is irresistible; but it does not embrace all the nations of the earth; nor does it carry onward and upward with equal steps all that are within its area. It moves with different rapidity among different peoples, and in the different classes of the same people. It exerts its influence with varying power and effect, and distributes

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<sup>1</sup> Calculated from the Registrar-General's Reports, 1838–1854.

its blessings with varying liberality. Upon some, these are poured with lavish generosity, and to others, they are doled out with the most niggardly parsimony, and thus it has been through all the ages of the world.

In every civilized country, however generally cultivated, there are those who live in filthy and smoky and dark cabins, on swampy ground, amidst noisome effluvia; and those who live in narrow, crowded rooms on undrained and unwashed streets, with pestilential exhalations without and stenchy air within; whose clothing and food resemble as nearly as may be the raiment and nutriment of the Middle Ages: these suffer, as did their ancestors long ago, from the consequences of the neglect of sanitary laws;—they have more frequently consumption, dysentery, and fever, and drag out attenuated lives to early graves.

### *Drawbacks of Civilization.*

Although pure and unadulterated civilization is in itself unmixed good, and brings only health and life, yet it is sometimes accompanied with evil. Progress too often brings its drawbacks with it. Luxury, self-indulgence, sensuality, and effeminacy too often attach themselves to it. Intemperance, the use of alcohol, tobacco, opium, and other destructives; late hours, spent in vulgar or graceful dissipation—all of these, each in its own way, and in its own degree, small or large—waste life's force and hasten its end; but they are no part of civilization.

### *Education.*

Although men and women toil less severely and protractedly with their bodies, and exhaust themselves less through their muscles, now than in former generations, yet they work more with their brains. They do more mental labor, and expend more vital force in that way. There is a higher and more extended scholarship, and many more that seek it with absorbing and exhausting devotion. Business, finance, public interests, ambition, generous and comprehensive charities, the pursuit of knowledge, science, literature—these and other matters of care and anxiety more frequently now than in former ages lay burdens on the

brain heavier than can be safely borne. All the fields of mental labor and avenues to distinction become more and more open as civilization advances; the incitements to enter them are greater and more promising; the prizes are richer and more attractive and apparently more readily attainable.

The proportion of people who are drawn from the monotony of manual labor, to join the livelier race in the pursuit of knowledge, ambition, or riches, is greater and greater through successive generations. But this high mental culture, which is in itself a rich blessing, brings with it many dangers to health and life. Of the great multitude who thus find their bread and their happiness in brain-work, there are not a few who pursue their phantoms of complete knowledge or success, with all their mind and might, until their physical forces are wasted and an early death ends their enfeebled lives.

### *Clothing.*

Although the fabrics of wool, cotton, silk and linen have multiplied, and cloths of every sort are made, soft, warm, suitable for every season, and so cheap that every one, however poor, is or can be better and more healthfully clothed than his ancestors; and though our tailors are more skilful in their adaptations, and our costumes fit our frames better, and our garments protect us more from cold and storms, while they interfere with our movements less than those of former times—yet we have still to contend with the errors of fashion, which does not recognize the sanitary code as its supreme law, but dresses men, women and children according to its capricious taste, and at times exposes them to suffering and to disease.

Thus we see that civilization has been various in its operations with different peoples and persons. It has varied in its powers and its progress, and in its good and evil results. But whenever and wherever the world has been cultivated, elevated and improved, then and there civilization has increased men's, women's, and children's vitality, and has lessened the amount and the destructiveness of disease. It has not only increased the number of the days of life on earth, but it has made those days more strong and effective.

*Civilization has yet more to do.*

Although civilization has done so much for human life, it has not yet wrought its perfect work. Life is yet to be enlarged, strengthened, and protracted.

The average longevity of those who died, within the latest recorded years, was, in Massachusetts, 28 years and  $3\frac{2}{3}$  months; Vermont, 36 years and 5 months; Sweden, 29 years and 2 months; England, 29 years and  $2\frac{1}{2}$  months; France, 35 years and 11 months; Spain, 24 years and 4 months; Norway, 36 years and  $6\frac{1}{2}$  months;<sup>1</sup> instead of 70 or 80 years as it should be, and as it may be, and as it is with the most favored.

The expectation of life at birth, or the average longevity that is and will be enjoyed by all the children born, is, in England, 40 years and  $10\frac{1}{2}$  months; in France, 36 years and 1 month; in Sweden, 43 years and 5 months; and, by males, in the United States, 41 years;<sup>2</sup> instead of 80 years.

The full-grown men, completely developed and ready for work at twenty, in this country, at the present period, will have an opportunity of doing each before death only thirty-seven and one half years' work on an average, instead of doing 50 years' work—as they should—with the best constitutions in the most favorable conditions, before reaching the allotted threescore and ten. That is, a thousand persons now just entering the field of self-sustaining life will live and labor thirty-seven thousand five hundred years, in their days of vigor and self-sustaining power, before they shall die or pass into old age. This is only three fourths of the allotted fifty working-years which are enjoyed by the most favored. The loss is great, but it is much less than it was in former generations.

The field of vitality is yet only partly cultivated. There is much to be secured, and very much to be gained. The parts yet untouched or only slightly improved are as susceptible of culture as those already cultivated. There are yet the ignorant, the poor, and the overworked; there are yet the badly fed, unsuitably clothed, and imperfectly housed; there are those who dwell in the

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<sup>1</sup> Calculated from recent mortality reports.

<sup>2</sup> Life-tables of these countries.



wet and marshy districts of the country and breathe the pestilential miasmas exhaled around them, and those who live in the crowded and noisome streets and dens of the city. There are the uninstructed in the law of life—a mighty host; and the careless of its requirements, a still greater multitude. There are the sensualists, the self-indulgent, and the dissipated; all these, here and everywhere, are yet to be reached by the elevating power of civilization and blessed by its influences.

Those whose years are weakened and whose lives are shortened are no more fixed by any law of nature in their present low vital condition than were their fathers, ages ago. There is nothing more in their personal organization or social relation, to prevent their improvement, than there was with people similarly circumstanced in times past. These have the same power as their fathers, and more opportunity, to amend their condition and their habits, to increase their strength and diminish their ailments, and prolong their days on earth. And they will do so; the present and the coming generations will go on in this good way; each will make some progress, and to each successively will be given a larger, richer and longer life.

How long it will take to complete this work of human development and longevity—how many generations must pass before threescore and ten years, instead of being the maximum as the psalmist thought, and the lot of only the favored and the few as now, will be the minimum, the assured lot of all the children of men—we cannot tell, nor is it needful for us now to know. Sufficient for us is it to know that, by carefulness and culture, life has increased, and to feel assured that by the same means it may be still further expanded; and as we received a richer legacy of life from our fathers than they received from theirs, so it is our duty and our privilege to improve this heritage, to add our part to its worth and its power, and to leave it to our children more effective and enduring than we found it.



THE  
**INCREASE OF HUMAN LIFE.**

READ BEFORE THE  
AMERICAN STATISTICAL ASSOCIATION.

By **EDWARD JARVIS, M.D.**  
President of the Association.

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